Assembly Theory Is Physics Getting Closer to Software

Terry Bollinger
2023-11-17.14:25 EST Fri
https://youtu.be/w9EUGVsKqdU&lc=UgwKsrS3doy_7oKsK254AaABAg.9x42-7y6GHM9xE3yLZvF1f

A Comment on the Dr Ben Miles (YouTube) post:
New Breakthrough Theory Lets Physics Predict Evolution - Assembly Theory Explained (Nov 9, 2023)
https://youtu.be/w9EUGVsKqdU

Terry Bollinger, 2023-11-13.17:06 EST Mon:

Dr. Ben Miles, thank you for an excellent summary of Assembly Theory. From your video and the original papers, the main point of assembly theory is that successful evolution is necessarily multi-level, with each level having an independent ability to select, remember, and replicate valuable entities. Software designers call this modularity.

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notsojharedtroll23, 2023-11-17.08:30~ EST Fri

At this pace, we will need OOP developers to apply proper software design patterns…

Terry Bollinger on 2023-11-17.14:25 EST Fri

notsojharedtroll23, pretty much. Suppose you make the not-too-radical assumption that history works bottom-up. In that case, every bump between two bits of energy or matter creates an irreversible historical event regardless of their relative sizes. You get a vast Lamport network [1][2] of asynchronous interacting processes. All the supposedly fundamental laws of classical physics, including the constrained forms of change and distance we call time and space, become secondary effects emerging from the multi-scale synchronization of all those events. You can locally force this spacetime approximation to look as smooth as you wish by packing higher densities of events ("pixels") into a small region of space. However, fundamentally, it's never more than a finite-resolution network simulation. Quantum mechanics is what you get when you try to extract information beyond the network's actual resolution.

Alas, there are no continuums, multiverses, itty-bitty vibrating strings, block universes, or event infinite-dimensional Hilbert space quantum superpositions in such a universe. Those all become illusions created by assuming that information storage is free. You get black holes, but they stop at the event horizon: no singularities.

If you were wondering, you also don't get cellular automata networks. That's because bit storage is another emergent phenomenon, making the cost of placing already-classical cellular automata throughout space impossibly high. These various impossibilities, which include smooth manifolds and all infinitely differentiable forms of mathematics, share the same non-physical, non-experimental feature: A belief that information storage comes at zero or negligible cost. A Lamport universe doesn't have room for that level of resource presumption.

What you do get, however, is a universe that looks much more like what resource-limited software designers must deal with daily. While accepting infinite limits as no-cost givens can be fun conceptually, these concepts don't exist experimentally or computationally. So why try to build your universe out of them as if they are "fundamental" when all we ever experimentally see is finite resolution? You are better off starting over with the language and concepts of the software world, which more clearly recognizes events, messaging, networks, network synchronization, and modularity as first-order principles.

Even in its name, it's hard not to see assembly theory as physics moving slowly closer to software and network perspectives and terminologies. Physics is having difficulties with this important conceptual transition mainly because of those "bumps" I mentioned earlier. In physics terminology, those are called "quantum wave collapses." Many clever people have devoted enormous intellectual effort to making wave collapses disappear since they are not mathematically smooth and don't follow the usual rules of space and time.

However, if space and time are nothing more than grainy emergent effects of an extensive Lamport network, does it even matter if wave collapses are grainy and fail to follow the overly perfect rules of classical spacetime?

It's time for physics and continuum mathematics to move away from the experimentally non-tenable premise that information storage is "free" in the physical universe. Object-oriented concepts applied to Lamport-parallel networks are more likely to be relevant to advancing and fully integrating physics than any number of speculations, no matter how popular, that instead begin with the assumption that information is free for the taking.

References

[1] L. B. Lamport, "Time, Clocks, and the Ordering of Events in a Distributed System," *Communications of the ACM*, vol. 21, no. 7, Jul. 1978. https://dl.acm.org/doi/abs/10.1145/3335772.3335934

[2] I sincerely thank Jean Michel Sellier for pointing out the potential connection between Leslie Lamport's work and physics concepts of emergent space and time. Ironically, while I first learned to use Lamport's diagrams decades ago, I wouldn't have connected Lamport's approach and my recent work on bottom-up causality in physics without Dr. Sellier's observation.